Original Article

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Clinical Profile of Traumatic Cataract at a Tertiary Center in North India

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Abstract

Aim: The aim of this study was to evaluate clinical and epidemiological profile of traumatic cataract at our hospital setting. *Methods:* This was a retrospective study which enrolled all the patients diagnosed with traumatic cataract and operated at SGRRIM & HS, Dehradun between January 2015 and December 2018. Preoperative data was recorded in terms of age, sex, time of presentation of the patient, type of trauma, morphology of cataract, preoperative vision and associated anterior and posterior segment ocular injuries. Postoperative data included uncorrected visual acuity (UCVA) at day one and best corrected visual acuity (BCVA) at 6 weeks. Statistical analysis used was SSPV software. *Results:* Majority of patients were males (74%), between 16 and 30 years of age group (39.6%) and penetrating trauma (58%) was more common than blunt trauma. Road side accidents (41%) was the commonest mode of injury followed by domestic violence (34%) and least was industrial trauma. (25%) Most of the patients operated had intraocular lens (IOL) implantation and only 11.3% were left aphakic. Postoperative BCVA at 6 weeks was in range of 6/60 to 6/24 in majority (47.16%) of cases while 39.62% of patients had better (6/18 –6/6) visual outcome. Corneoscleral perforation was the most common comorbidity. (43.4%) Retinal detachment (RD), traumatic optic neuropathy (TON) and endophthalmitis were the main causes of poor visual outcome seen in 13.22% of cases. *Conclusion:* Our study has shown that main cause of traumatic cataract was road side accidents in younger age group predominantly males which could have been minimized by general public awareness of traffic rules, use of helmets and avoiding drunken driving.

Keywords Traumatic cataract; Visual outcome; Penetrating trauma.

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Introduction

Ocular trauma though unpreventable at times can occur at any age but the younger population is the most vulnerable. "According to WHO programme for the prevention of blindness, approximately 1.6 million people in the world become blind as a result of ocular injury. Around 55 million eye injuries occur each year, including two lac open globe injuries requiring admissions, therefore ocular trauma becomes a public health hazard."[1,2] Among any insult to the eye from no matter any mode of injury, traumatic cataract is an important cause of visual impairment. Though traumatic cataract is treated surgically in similar ways as senile cataract, the associated injuries may compromise the final visual outcome. The cataract removal can be done in the same sitting or planned later on depending upon the comorbidities in the eye. The benefits of secondary removal are improved visibility, ease of tissue manipulation and less chance of postoperative complications.[3] The aim of this study was to review clinical and epidemiological profile of traumatic cataract in patients reporting from remote hilly

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areas to our hospital setting and to contribute to pre-existing data on this entity reported in various studies done so far.

Materials and Methods

This was a retrospective study which included 53 eyes of 53 patients diagnosed with traumatic cataracts and managed in our department between January 2015 and December 2018. We went ahead with the data collection from central record section after formal approval from the hospital research committee. Patients with unsure history of trauma, time of presentation more than twelve months and any pre-existing ocular pathology were excluded.

Based on the morphology, the traumatic cataracts were classified as rosette, white soft, posterior subcapsular, anterior subcapsular and membranous cataract. The preoperative data was recorded in terms of age, sex, time of presentation of the patient, type of trauma, mode of injury, type of traumatic cataract, visual acuity using Snellen chart, intraocular pressure (IOP) and associated anterior and posterior segment injuries.

The surgical technique used was either SICS (small incision cataract surgery) with 6.0 to 6.5 mm sclerocorneal tunnel or clear corneal PHACO (phacoemulsification), selected according to morphology of cataract, condition of lens capsule, and the associated injuries. Primary IOL implantation in the bag or sulcus was performed whenever possible. In cases of corneoscleral perforation with hazy media, first corneosclera repair was done followed by secondary IOL implantation. ICCCE was performed with anterior vitrectomy with AC IOL implantation in cases of dislocated cataractous lens. The postoperative evaluation was done in terms of UCVA (uncorrected visual acuity) at day one and BCVA (best corrected visual acuity) at six weeks.

Statistical analysis: The complete data was analyzed using SSPV software. Pie charts were used for age, gender distribution and type of trauma. Bar diagrames were used to illustrate final outcome measures.

Results

Our sample size consisted of a total of 53 patients with male predominance (74%). Majority of cases (39.6%) were of younger age group that is between 16 and 30 years.

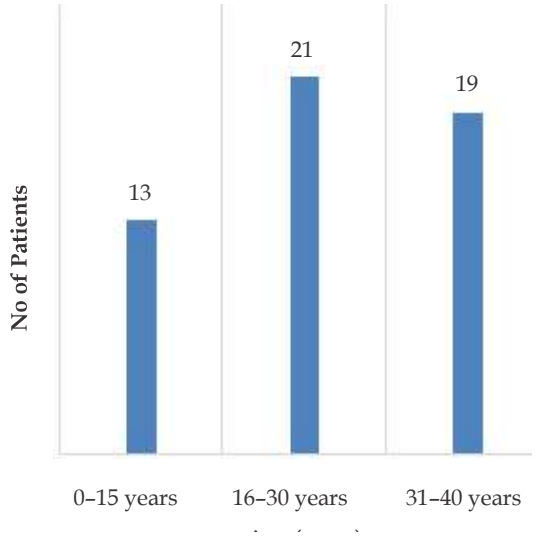

Fig. 1: Age-wise distribution.

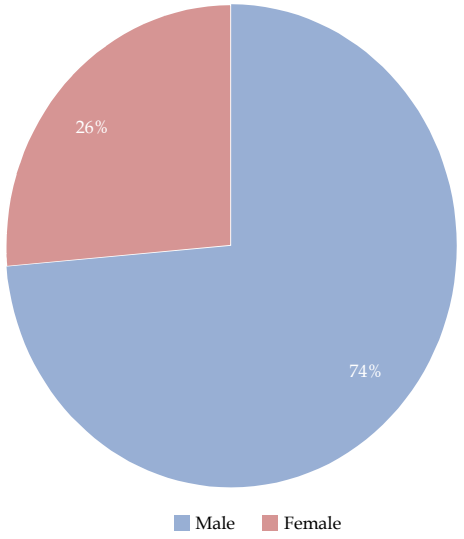

Fig. 2: Gender-wise distribution.

Penetrating trauma (31 eyes –58%) was relatively and common cause of traumatic cataract as compared to blunt trauma (22 eyes –42%). Majority of cases were of road side accidents (41%) followed by domestic violence (34%) and least was industrial trauma or trauma at workplace (25%) (Figs. 3 and 4). Common objecst causing injuries were metal piece (36%), stone particle (23%) wooden stick (21%) pencil/pen/knife (7.1%), glass piece (3.7%), fire cracker injury/blast injury (6%). Another 3.2% was due to animal bite (dog bite, bear bite).

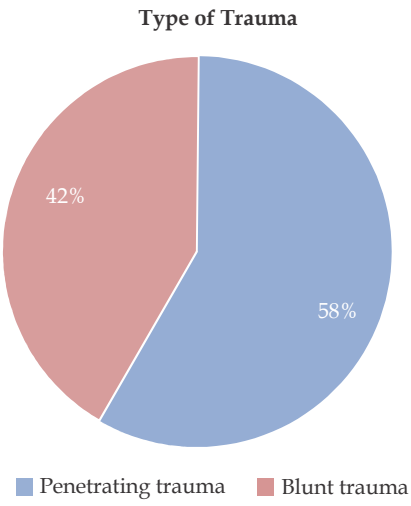

Fig. 3: Type of trauma

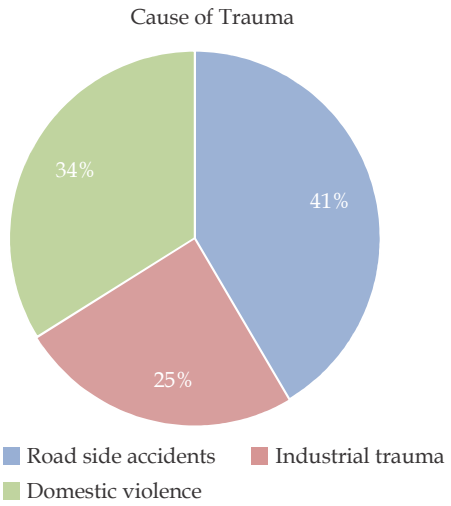

Fig. 4: Causes of trauma

Total cataract (white soft) was the most common variety of traumatic cataract (47.2%) followed by posterior subcapsular cataract (34%). Majority of patients presented within a month (34%) followed by within a week of injury (32.1%) (Table 1).

Table 1: Morphology of traumatic cataract and time of presentation of patients

	N	%
Morphology of Cataract		
Total cataract (white soft)	25	47.2
Rosette cataract	6	11.3
Anterior subcapsular cataract	2	3.8
Posterior subcapsular cataract	18	34.0
Membranous cataract	2	3.8
Time of presentation of patient		
Within a week	17	32.1
Within a month	18	34.0
1 month – 6 months	12	22.6
6 months – 1 year	6	11.3

Among associated ocular injuries, corneal perforation seen in 23 cases (43.4%) and uveal prolapse in 12 cases (22.6%) were the most common anterior segment involvements which required repair and reposition. Four cases (7.5%) had dislocated cataractous lens in AC. Lens capsule rupture was seen in 6 cases (11.3%). Posterior segment insult which led to poor outcome were RD (3.8%), endophthalmitis (5.6%) and traumatic optic neuropathy (1.9%) Other comorbidities were treatable (Table 2).

Table 2: Associated ocular injuries

Anterior Segment	*N*	%	**Posterior Segment**	*N*	%
Corneal perforation Sclerosis	23	43.4	Vitreous hemorrhage	18	34.0
Uveal prolapse	12	22.6	Retinal detachment	2	3.8
Uveitis	27	50.9	Comotio retinae	3	5.7
Hyphema	24	45.3	Macular edema	9	17.0
Vitreous in anterior chamber	4	7.5	Traumatic optic neuropathy	1	1.9
Rise in intraocular pressure	11	20.8	Endophthalmitis	3	5.6
Traumatic mydriasis	2	3.8			
Lens capsule rupture	6	11.3			
Subluxated lens	4	7.5			

SICS was the most common technique used (50.9%) while PHACO was done in 45.3% cases. Two cases of subluxated lens landed up in ICCE with PI. Though 6 patients were left aphakic (11.3%), majority received IOLs (47 eyes –88.7%) (Table 3). Out of 47 eyes 19 cases (40.42%) had primary IOL implantation while 28 eyes were reoperated to implant IOL (59.57%) (Table 3).

Table 3: Type of surgery

Type of Surgery	*N*	%
PHACO	24	45.3
SICS	27	50.9
ICCE with PI	2	3.8
IOL implantation	47	88.7
No IOL implantation	6	11.3 (Aphakia)
Primary IOL implantation	19	40.42
Secondary IOL implantation	28	59.57
IOL in bag	21	39.6
Sulcus placed IOLs	23	43.4
AC IOL (Kelman Multiflex)	3	5.7

PHACO: Phacoemulsification, SICS: Small incision cataract surgery, ICCE: Intracapsular cataract extraction, IOL: Intraocular lens, AC: Anterior chamber

The preoperative vision was in poor range (<3/60) in majority of patients (50.94%), but improved to 6/60–6/24 in about 67.9% of cases on day one postop. The final visual outcome of patients at 6 weeks follow-up was 6/18–6/6 in 21 eyes (39.62%) and 6/60–6/24 in 25 eyes (47.16%). About 13.22% (7 eyes of 53) of the patients had poor visual outcome (less than 6/60) (Table 4, Fig. 4).

Table 4: Comparison of preoperative and postoperative vision

Range of vision	Preoperative BCVA	Postoperative UCVA at day 1	Postoperative BCVA at 6 weeks
6/18–6/6	1 (1.88%)	11 (20.75%)	21 (39.62%)
6/60–6/24	3 (5.66%)	36 (67.9%)	25(47.16%)
<6/60–3/60	22 (41.50%)	3 (5.66%)	4(7.54%)
<3/60 – PL+PR-Accurate	27 (50.94%)	3 (5.66%)	3(5.66%)

UCVA: Uncorrected visual acuity, BCVA: Best corrected visual acuity

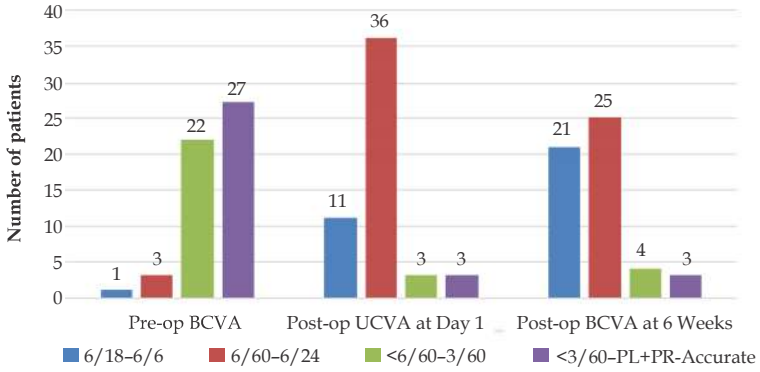

Fig. 4: Comparison of preoperative and postoperative vision.
UCVA: Uncorrected visual acuity, BCVA: Best corrected visual acuity

Discussion

Cataract is the commonest complication following ocular injury.[4] "Traumatic cataract results most commonly from either penetrating injuries from sharp objects like stick or thorn resulting in direct injury to lens or through blunt trauma by objects like stone, cricket ball, etc. Rarely, it can occur from electrical shock, ionizing radiation or infra-red rays (glass blower's cataract)."[5] "Although ocular

trauma affects all age groups, the distribution for occurrence of serious ocular trauma is bimodal with maximum incidence in young adults and another peak in elderly."[6] "The underlying pathophysiological mechanism of lenticular opacification in cases of trauma is either direct rupture of lens capsule or coup, countercoup insult with equatorial expansion due to hydraulic forces. Penetrating trauma results in small focal opacities or total cortical opacification depending upon extent of lens capsule rupture. Rosette-shaped posterior axial opacities are very typical of blunt trauma which may be stable or progressive".[7] Surgical technique varies with specific nature of ocular pathology. In any situation intraoperative tissue respect is most important. Most of the surgeons prefer secondary IOL implantation as media is often hazy due to corneal edema or corneal rupture and status of lens capsule is at times difficult to assess. Attempting primary IOL implantation is not an easy job, still reconstruction of anterior-segment and cortical aspiration with primary IOL implantation has been reported in various studies. Baykara et al. have used AC maintainer after primary repair followed by cataract removal and primary IOL implantation in carefully selected patients with perforating injuries yielding visually rewarding results.[8] Moisseiev et al. have also reported favourable visual outcome after primary IOL implant.[9]

Our sample size consisted of a total of 53 patients with male predominance (74%) and majority of cases were of younger age group that is between 16 and 30 years. Penetrating trauma (58%) was relatively and common as compared to blunt trauma (42%). Majority of cases were of road side accidents (41%) followed by domestic violence (34%) and least was industrial trauma or trauma at workplace (25%). A study done by Mousumi et al. also showed male preponderance similar to our study (66%) but children below 10 years were mostly (27.08%) affected and blunt trauma was more common with wooden stick being the commonest object.[10] In another study reported the age range of the cohort was 3–17 years with 82.76% of affected boys and 62.07% eyes had penetrating trauma. Eye injuries resulting from organic foreign bodies were the most common (24.14%), followed by falls (10.34%), metal foreign bodies (10.34%) and fishing tool injuries (10.34%).[11]

As far as results of our study are concerned, though preoperative vision was in poor range (less than 3/60), it improved to 6/60 to 6/24 in about 67.9% of cases on first postoperative day. The final visual outcome at 6 weeks. Follow-up was in the range of 6/60 to 6/24 in majority of cases (47.16%) and much better (6/18–6/6) in 39.62% of cases. Poor visual outcome (less than 6/60) was seen in 7 eyes (13.22%) out of total of 53 patients. RD, TON and endophthalmitis were the main reasons. Though our study revealed road side accidents as most common cause, Parihar et al. reported "industrial trauma as the most significant causative factor (41.66%) followed by environmental trauma (31.67%) and domestic accidents (26.67%). There were no significant variations in trend of penetrating or blunt injuries in different modes of trauma in this series. Hammer chips resulted in penetrating injuries in 10 cases (40% of total industrial accidents) followed by cut metal wire and metallic piece. Accidental indirect hit of flying objects was leading cause of blunt injuries in 5 of 8 cases of industrial accidents."[12] Another study reported that work place was the most common place (56.66%) of injury followed by home (26.66%). The incidence of open globe injuries (86.66%) was more than closed globe injuries (13.33%).[13] As per Boo Sup Oum et al. 34.9% injuries occurred at workplace, 32.2% at home and 25% at street but closed globe injuries (85.8%) common compared to open globe (14.2%) injuries.[14] Another study also showed relatively younge age group with a large majority of the cases aged less than 40 years (67.5%), and a male preponderance (62.5%). The most common type of cataract developed was found to be 'white soft' type (47.5%). In 52.5% of patients, the time lag between injury and surgery was found to be 1 week to 1 month. It was found that 70% patients had regained vision more than or equal to 6/18.[15]

Limitation

The main limitations of our study were lack of complete data, small sample size and loss of follow-up of the patients reporting from remote hilly areas.

Conclusion

Role of government and nongovernmental organizations (NGOs) is very important in prevention of eye trauma. Awareness of inherent danger towards susceptible domestic and environmental objects, health education on use of safety devices at industries and strict followance of traffic rules may help in reducing the risk. Mass media campaigns to emphasize eye health awareness should be a part of curriculum, in schools and colleges apart from other institutions. There is a strong need of trained ophthalmologists and

admission facilities even in remote areas as most of the patients land up in active surgical intervention in cases of ocular trauma.

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Conflicting Interest: Nil

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